

Headquarters
US Army Armor Center and Fort Knox
Fort Knox, Kentucky 40121-5123
25 August 2006

*Fort Knox Pam 350-70

Training

INTERACTIVE MULTIMEDIA INSTRUCTION (IMI) DESIGN AND DEVELOPMENT GUIDE

Summary. This pamphlet provides clear design and development guidance for browser-based IMI developed for the Armor proponent to government training developers, subject matter experts (SMEs), course managers, and contract personnel on the procedures, requirements, and responsibilities associated with producing effective IMI for the Armor proponent. The sections of the style guide are sequenced, as closely as possible, in the same order as the activities in the IMI production process. It is to be used with TRADOC Regulation 25-30, TRADOC Regulation 350-70, and TRADOC Pamphlet 350-70-12.

Applicability. This pamphlet applies to all departments of the US Army Armor Center and Fort Knox receiving support from the installation in development of IMI.

Suggested improvements. The proponent of this pamphlet is the Directorate of Training, Doctrine, and Combat Development (DTDCD). Users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to Commander, USAARMC and Fort Knox (ATZK-TDT-P), Fort Knox, Kentucky 40121-5123.

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This pamphlet supersedes Fort Knox Pam 350-70, 26 July 2005.

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Chapter 1

Introduction

1-1. Purpose.

a. The intent of this document is to provide clear guidance to government training developers, SMEs, course managers, and contract personnel on the procedures, requirements, and responsibilities associated with producing effective IMI for the Armor proponent. The sections of the style guide are sequenced, as closely as possible, in the same order as the activities in the IMI production process.

b. This style guide provides design and development guidelines for browser-based IMI developed for the Armor proponent. It contains guidance on producing IMI to meet the requirements outlined in the Distributed Learning Education and Training Products (DLETP) performance work statement (PWS) for the development of new IMI courseware or the revision of existing IMI courseware.

1-2. References.

a. TRADOC Regulation 25-30, Preparation, Production, and Processing of Armywide Doctrinal and Training Literature (ADTL), 30 March 1990.

b. TRADOC Regulation 350-70, Systems Approach to Training Management, Processes, and Products, 9 March 1999.

c. United States Marine Corps, Interactive Multimedia Instruction (IMI) Style Guide, Version 2.1, 1 July 2001.

d. TRADOC Pamphlet 350-70-2, Multimedia Courseware Development Guide, 26 June 2003.

e. TRADOC Pamphlet 350-70-12, Distributed Learning - Managing Courseware Production and Implementation, 29 March 2004.

f. Distributed Learning Education and Training Products Performance Work Statement (PWS) for Maintenance of Interactive Multimedia Instruction (IMI) Courseware, 24 March 2006.

g. Distributed Learning Education and Training Products Performance Work Statement (PWS) for New Development of Interactive Multimedia Instruction (IMI) Courseware, 24 March 2006.

h. DOD Instruction 1322.26, Development, Management, and Delivery of Distributed Learning, 16 June 2006.

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Chapter 2

Distance Learning (dL) Phase

2-1. dL Deliverables.

Government Furnished Information (GFI) Report	<p>This report documents all GFI listed in the PWS and any additional GFI determined by the government to be necessary for IMI development. The report verifies that all GFI has been received by the contractor.</p> <p>See the PWS, Section 1.1, <u>Purpose</u>, and Attachment #7, Section 1.0, <u>Government Furnished Information Report</u>.</p>
Instructional Media Design Package (IMDP) with Prototype	<p>The IMDP documents design decisions for the dL phase and serves as a blueprint for development. The IMDP includes the following: a summary description that explains the design of the entire course and how dL lessons fit into the overall training strategy, a detailed course map, instructional and assessment strategies used in the dL part of the course, and lesson specification worksheets for each dL lesson.</p> <p>See the PWS, Section 2.1, <u>Design Specifications</u>; Section 2.2 <u>Lesson Specification Worksheets</u>; Attachment #2, Section 2.0 <u>Instructional Strategy</u>; and Attachment #7, Section 2.0, <u>Instructional Media Design Package (IMDP)</u> .</p> <p>To see the complete IMDP Data Item Description (DID), go to http://www.atsc.army.mil/itsd/imi/DLETP_DID.asp and click DI-SESS-81520B.</p> <p>The functional prototype, created from storyboards for one lesson (objective), is a fully developed working model that incorporates content, functionality, and media elements representative of those that will be used through the entire course. Other forms of prototype, such as a sharable content object (SCO) or aggregation, which illustrates various instructional strategies used in a content package, are acceptable as approved by the government. See Section 7-1 of this style guide for more information on SCOs.</p>

<p>Training Evaluation Document</p>	<p>The Training Evaluation Document, sometimes called the Validation Plan, describes how the courseware will be validated to determine the effectiveness of the training. The Training Evaluation Document details the following:</p> <ul style="list-style-type: none"> • How course instructional value will be measured statistically. • What methodology and instruments will be used to gather data. • Personnel who will participate in the validation and provide feedback. • The roles and responsibilities of the agencies involved in the validation process. <p>To see the complete DID for this deliverable go to http://www.atsc.army.mil/itsd/imi/DLETP_DID.asp and click DI-SESS-81524B.</p> <p>See the PWS, Attachment #2, Section 8.0, <u>Content Validation</u>.</p>
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Table 2-1. Course Design Deliverables.

Note: The PWS requires the government to review each delivered product and submit required revisions to the contractor within 10 working days.

2-2. Courseware Revision Vice New Development. In the event that the PWS calls for revision of an existing course rather than new development, the design and development deliverable requirements will be revised to reflect only what is needed to support updating of the existing courseware. For example, the standard for the IMDP would change based on the courseware updates needed. These revised requirements will be addressed on a case-by-case basis. See the DLETP PWS for maintenance of IMI courseware.

2-3. Course Design Process.

a. The Army Training System (TATS) Courses. For TATS courses to be TATS compliant, all tasks trained in the resident course must also be trained in the reserve component course. This requires that each lesson be linked to individual tasks to ensure all tasks are accounted for.

b. Learning Taxonomy. The learning taxonomy is a description of the various components of a course and how they relate to each other. The taxonomy for Armor browser-based instruction is listed in order from largest to smallest in the table below. See Fort Knox Regulation 350-2 for more information on course structure.

Component	Description
Course	A complete series of instructional units (phases, modules, and lessons) identified by a common title or number. It trains critical tasks required for qualification of a specific MOS/SC or functional area. It is usually designed to train all tasks that exist in a resident course.
Phase	A major part of a training course, which may be trained at different locations. Phases are required as a necessary breakup of a course version due to time, location, equipment, and facility constraints, as well as facilitation in management of different techniques of instruction. A phase contains one or more modules.
Module	A grouping of related lessons in an approved course of instruction.
Lesson	The basic building block of all training. In traditional instruction, a lesson generally teaches one task or SCO. In scenario-based instruction, a lesson may contain related tasks or SCOs, which are assessed together using a scenario.
Task	The lowest behavioral level in a job or unit that is performed for its own sake. A task is determined through job analysis, approved by a formal task selection board, and developed by a SME. The training objective is derived from the job objective task, conditions, and standards taken from the Task Summary. It is then adjusted to reflect the training environment.
SCO	A piece of interactive multimedia instruction that is designed for reuse. For our purposes, a SCO is generally defined as a task and its associated assessments.
Performance Measure	Performance measures are the steps of a task which are critical to performing the task to standard. Performance standards are typically documented in the Task Summary.

Table 2-2. Learning Taxonomy.

c. Assessment. The assessment strategy is based on the course objective, the skill level of the target audience, and the level of learning required. The following table lists assessments and their attributes. See the PWS Section 2.4, Learner Performance Measurement Instruments/Test Specifications, and Attachment #2, Section 7.0, Strategy for Learner Performance Measurement Instruments/Tests.

Assessment Type	Level	Attributes
Pretest	Task	<p>Prescriptive at the task level. Mastery of task on pretest (100 percent) gives the student the option to skip or take instruction on a task. Pretests must be constructed to work with the LMS. See Chapter 7, Technical Specifications and Requirements.</p> <p>For scenario-based training, related tasks may be combined to form a scenario and assessed together.</p> <p>1 try per assessment item. No specific feedback is provided.</p> <p>Scored and tracked by Learning Management System (LMS).</p>
Posttest	Task	<p>Requires a passing score (usually 70 percent) for course completion. Assessment will simulate actual performance or application as closely as possible.</p> <p>For scenario-based training, related tasks may be combined to form a scenario and assessed together.</p> <p>One try per assessment item.</p> <p>Include feedback to the learner on his performance after test completion, i.e., score, questions missed and correct answers, and suggested remediation. No immediate student feedback.</p> <p>Scored and tracked by the LMS.</p>
Practice Exercise		<p>Practice exercises prepare learners for the posttest, so the majority of practice exercise questions should be similar in content and function to the posttest questions. They should not be exactly the same as the posttest questions.</p> <p>2 tries per assessment item with feedback.</p> <ul style="list-style-type: none"> On the first attempt, provide feedback (Tell the learner if the answer is correct or incorrect.) For correct answers, tell the learner why the answer is correct. For incorrect answers, give the learner an explanation that leads the learner to the correct answer whenever practical.

		<ul style="list-style-type: none"> On second attempt, provide feedback (tell the learner if the answer is correct or incorrect). For correct answers, tell the learner why the answer is correct. For incorrect answers, tell the learner why the answer is incorrect and tell the learner the correct answer. <p>Not scored or tracked by the LMS.</p>
Knowledge Check (check-on-learning)	Task Step or Performance Measure	<p>Knowledge checks prepare learners for the practice exercise, so the majority of knowledge check questions should be similar in content and function to the practice exercise questions. They should not be exactly the same as the practice exercise questions.</p> <p>Knowledge checks can use a variety of presentation strategies. Feedback strategies for knowledge checks differ based on the format of the question and the intent of the instructional design, as shown in two of the many possible types of knowledge checks shown below.</p> <ul style="list-style-type: none"> For multiple choice questions, two tries per assessment item with feedback. Follow guidelines in the Practical Exercise block above. For “compare your answer to the expert answer” questions, one try per assessment item with expert answer provided for feedback. <p>Not scored or tracked by the LMS.</p>

Table 2-3. Assessments and Attributes.

Note: Guidelines and requirements for designing IMI test items are at Appendix C, Interactivity Levels.

d. **Interactivity Levels.** The level of interactivity describes the amount of interaction between a learner and the computer, which leads directly to meaningful learning. Interactivity levels range from 1 to 4, with 1 being the lowest level of interactivity (page turner) and 4 being the highest level of interactivity (near real time). A single lesson is likely to have multiple levels of interactivity. The projected IMI hours at each level of interactivity is determined by the government and shown in Appendix 1 of the PWS. Complete descriptions, example verbs, and development guidelines for each of the levels are at Appendix C.

e. **User Interface Design.** Recommendations for interface design including global, navigational, and content elements, as well as content layout and graphics, are included in the following sections. Many of these elements are constrained by technical standards such as

SCORM, or prescribed by the existing functionality of Core LS. See Chapter 7, Technical Specifications and Requirements.

(1) Look and Feel. The look and feel of the course content includes the use of color, fonts, graphical styles in buttons, illustrations, etc. The Armor School has produced a standard interface template to be used in one of several palettes to display course content. An example is at Appendix F.

(2) Navigational Elements. User navigation between hypertext markup language (HTML) pages and between SCOs must be provided by the LMS in order to meet the requirements of the SCORM standard. User navigation within a media file, such as an animation or video, should be provided within the media file.

(3) Help Elements. Help can include a glossary, regulations, field manuals, technical manuals, graphics, job aids, and forms. It can also include instruction on navigation in the lesson or course.

(a) Course Introduction. The Course Introduction outlines the scope of the course and the parameters for learner participation. It is specific to a course and therefore not sharable. The Course Introduction includes the following elements:

- Course title.
- Comprehensive course description.
- Broad course goals encompassing learner outcomes.
- Minimum hardware, operating system, software, and plug-in requirements.
- Brief description of each module/lesson in the course.
- Pretest procedures.
- Posttest procedures and expectations including score required for successful task completion.

(b) User Interface Tutorial. This tutorial shows the user how to move through the instruction and utilize the tools that will assist in navigating the course. It should contain information on the following elements.

- Navigation. Description of each navigation button on the graphical user interface (GUI) and its function, including buttons such as Back and Next; Menu, Glossary, and Exit; and Play and Submit.

- Location Indicators. Description of elements that track a learner's location within a course/module/lesson/task, including but not limited to, the breadcrumb and the screen number indicator.

- Prompts. Description of the prompt function with examples.

- Functionality. Description of global course functions such as pop ups, glossary terms, and external hyperlinks.

- Special Symbols or Icons. Description of special symbols or icons used throughout the course and their functions.

(c) Help File Included in Each SCO Package. Each SCO will include a help file, which performs the same function as the User Interface Tutorial in a Course Introduction. As a result, when SCOs are viewed independently, this information will be available to the user. This help file stands on its own and will be accessed from the toolbar of the learning management system. It will exclude information on concepts or organization above the SCO level.

f. Prototype. The prototype lesson serves as an instructional, functional, and visual model for the remaining IMI. For maintenance courseware, the prototype lesson is a contractual requirement. The prototype lesson is delivered in Core LS, exported as a SCORM 2004 content package, and delivered with the IMDP to both DTDCD and the Army Training Support Center (ATSC). The ATSC will test the prototype lesson for SCORM conformance and playability, but the proponent is the approval authority for content, instructional strategies, and presentation. The ATSC has no contractual requirement to prototype new IMI courseware; however, the proponent recognizes the value of prototyping a new courseware lesson before delivering the first module to ATSC for testing and has made the prototype a required DTDCD deliverable. The prototype lesson is delivered to the DTDCD in Core LS at the same time the IMDP is delivered. However, the prototype lesson is not delivered to ATSC until the remaining lessons in the same module as the prototype lesson are ready to be delivered.

(1) The contractor and government choose a lesson, or representative portions of lessons, which will illustrate the intended lesson design, including interface, functionality, and instructional strategies.

(2) The contractor and project team design, develop, and validate the prototype lesson following the same procedures that will be used to validate subsequent lessons. These procedures are described in Chapters 3 through 5 of this style guide.

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Chapter 3

Lesson Design

3-1. Lesson Design Deliverables.

Lesson Map/Content Outline	The contractor will produce a lesson map or content outline for each lesson per the requirements in this style guide.
Storyboards	The contractor will produce storyboards for each lesson per the requirements in this style guide.

Table 3-1. Design Deliverables.

Note: Sample lesson map and storyboards are at Appendix A.

3-2. Lesson Design Process.

a. To begin the design phase for the prototype and each subsequent lesson, the contractor will produce a lesson map or content outline and brief it to the project team during the initial design meeting. The purpose of the lesson map or content outline is to illustrate and get agreement on the following: (1) topics that will be taught in the lesson and sequence in which they will be taught, (2) where the introduction, learning objectives, and summary will be sequenced in the lesson, and (3) where knowledge checks and practical exercises will be sequenced in the lesson. The contractor will revise the lesson map or content outline based on design discussions with the project team. When the project team and contractor agree the lesson map or content outline is accurate and reflects the appropriate content and sequence for the lesson, the contractor will develop storyboards. The lesson map or content outline should be accompanied by a brief document that explains the assessment strategy for the lesson.

b. The contractor will deliver storyboards to the project team prior to the design meeting to allow the project team ample time to review the storyboards and prepare comments and concerns for discussion at the design meeting. The amount of time between storyboard delivery and the design meeting is decided upon by the contractor and government. Generally, 3 days is adequate review time for one lesson. Based on decisions made during the design meeting, the contractor will make required changes and resubmit for project team review. The project team will meet with the contractor again, if necessary, to clarify and resolve any outstanding issues.

c. The contractor will begin the development phase of a lesson after the storyboards have been approved by the government.

(1) Lesson Map or Content Outline. A lesson map illustrates lesson content and sequence as a flowchart; whereas, the content outline illustrates the same information in a typical outline fashion. The contractor and government decide which method to use to show the content and sequence for the lesson.

(2) Storyboards. Storyboards illustrate the intended appearance and functionality of each page of the lesson and tests. They are used to communicate the content creator's intent for the design of an IMI lesson to all project team members, so the contractor and government share a full understanding of the proposed content, treatment, and functionality. A single storyboard portrays all content, graphics, animations, and other media elements for one HTML page of a lesson. Storyboards must be fully detailed to maximize efficiency during design and reduce the level of effort spent on revisions during lesson validation.

d. Each storyboard should include the elements in Table 3-2. Sample storyboards are at Appendix A.

Element	Description
Title	Lesson title.
HTML Page Title and File Names	The page title comes from the <Title> tag on the source HTML page. Complete file name of the page and file names of any embedded files (graphics, animations, media files, hyperlinks, etc.).
Navigation Information	Pages that display when Next or Back are selected.
Page Content	Instructional Page - Instructional content as it is to appear on the screen including hyperlinks, description of movement, audio script, and an illustration and/or description of what displays or occurs when an area of the screen receives a mouse click or mouse over event. Test page - The correct answer and all incorrect answers. PE or Knowledge check page - <ul style="list-style-type: none"> • The correct answer and related feedback. • All incorrect answers with specific 1st and 2d try feedback.
Media Description	Written description, visual representation, and/or actual copy of the graphic or media in sufficient detail for reviewers to grasp the proposed concept, which can include: <ul style="list-style-type: none"> • Reference to a graphic file name. • Directions regarding an animation. • Audio or video requirements including the script or the audio source file name or location.
User Instructions	Screen-specific directions that prompt the learner on what to do next.
Programmer Notes	Placement of text or objects, particularly in relationship to one another. Movement of text or objects on the screen. Hyperlink information.

Table 3-2. Storyboard Elements.

3-3. Content Design Guidelines.

a. Content Appearance.

(1) Present information in a top down, left to right format.

(2) Display important information prominently on the screen.

(3) Display information appropriate to the target audience when developing content including graphics, animations, and text.

Note: The recommended IMI interface template is at Appendix F. For general interface guidelines, see the Web Style Guide (www.webstyleguide.com/).

b. Text.

(1) Use TRADOC Regulation 25-30 as the guide for elements such as capitalization, pronoun use, bullets, tense, voice, prose style, tone, and other text considerations.

(2) Limit the amount of text on screen and use short lines of 30-50 characters.

(3) To help the learner to mentally organize information, which aids in retention, integrate text with graphics rather than presenting a discrete list next to an image. Here is an example.

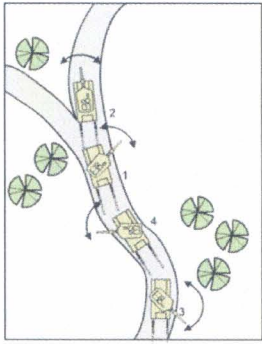
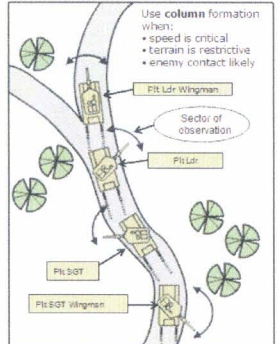
Ineffective – Discrete Text	Effective – Integrated Text
 <p>The picture on the left shows a platoon moving in a road march in a column formation. The column formation is used when speed is critical, when the platoon is moving through restrictive terrain on a route, and/or when enemy contact is not likely.</p> <p>Note each vehicle's sector of observation.</p> <p>In this example, the PL's wingman is in front (2), followed by the PL (1), followed by the PSG (4), with the PSG's wingman (3) as the trail vehicle.</p>	<p>Platoon Road March Column Formation</p>  <p>Use column formation when:</p> <ul style="list-style-type: none"> • speed is critical • terrain is restrictive • enemy contact likely <p>PL's Wingman</p> <p>Sector of observation</p> <p>PL's</p> <p>PLSG</p> <p>PLSG's Wingman</p>

Figure 3-3. Integrated Text Example.

(4) Avoid long segments of text wherever possible. Convert long text segments to PDF format and provide a link.

(5) Use short sentences and paragraphs, and break up lengthy sentences using bullets, numbered lists, tables, and charts.

(6) Provide adequate white space to separate blocks of text.

(7) Avoid using words in all uppercase, underlining (except for hyperlinks), italics (use bold for emphasis), and blinking text.

c. Graphics.

(1) Validate proper rights, permissions, and acknowledgements for use of all graphics in a multimedia environment (Web, CD-ROM).

(2) Size graphics to adopted template layouts.

(3) Ensure screen graphic artwork has a consistent look and feel.

(4) Title illustrations clearly with appropriately sized fonts.

(5) Avoid overloading illustrations with small symbols or graphics.

(6) Avoid using numerous visual cues or colors.

(7) Ensure key details are easily identified.

(8) Compress graphics and save them in a .jpg format. Save simple line art, logos, icons, and tables in a .gif format.

(9) Ensure consistent look for photos and graphics by establishing standards (e.g., backgrounds, borders, size of borders, etc.).

(10) Use 72 dots per inch (dpi) of detail for all images.

(11) Optimize graphics for viewing in an online browser environment. Use appropriate file formats (e.g., .gif and .jpg).

(12) Save large graphics in a progressive download format (e.g., .gif and .jpg).

Note: Descriptions, examples, and guidelines for the levels and types of graphics used in IMI are at Appendix G.

d. Media.

(1) Always allow learners to control the playing of animations or video. Avoid timed effects.

(2) Use special effects only when required for emphasis or transition. Avoid special effects that detract from instructional content.

(3) Use audio judiciously. When audio is used, ensure the learner always has control.

(4) Minimize narration to keep file size manageable. Narration should be used to further explain or provide details. Do not use narration to read the text on the screen to the user.

(5) Validate proper rights, permissions, and acknowledgements for use of all media in a multimedia environment (Web, CD-ROM).

(6) Use video judiciously, to reinforce, clarify, or emphasize a specific behavior or learning objective that cannot be effectively taught using static graphics or animations.

(7) Animation should be used to present interactions, demonstrations, processes, or other complex information. They should not be used to present static information or as a means to provide functionality that can be presented using normal HTML techniques or via the LMS. Animation files should be used one per HTML page and should not call other animation files, thus bypassing the LMS and its SCORM export functionality.

(8) Limit video clips to 20 seconds. Video should be delivered through animation files.

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Chapter 4

Lesson Development

4-1. Deliverables.

Instructional Media Package and Test Package*	<p>This package consists of all lessons and tests produced and validated during the development phase.</p> <p>* When all lessons and tests are complete and validated, they will be included in the Instructional Media Package and Test Package, which is delivered to ATSC.</p>
SCORM Metadata	As part of the SCORM conformant content package, the contractor will create SCORM metadata for each SCO (see paragraph 4-3).
Automated Systems Approach to Training (ASAT) lesson data	The contractor will create or update the lesson data specified in TRADOC Pam 350-70-12 in the ASAT database. The Training Doctrine and Development Tool (TDDT) is the next generation training development tool that will replace the ASAT software program.
Lesson Content Flow Diagram	<p>The contractor will develop a lesson content flow diagram that indicates the navigational flow of HTML pages and their titles and file names. The lesson content flow diagrams must be delivered prior to the Alpha test (initial government review) so the lesson may be hung in Core LS. See Appendix H for an example.</p> <p>The contractor must update the diagram prior to ATSC delivery to reflect any Alpha or Beta test changes.</p>
Answer Keys	The contractor will create answer keys for the pretest, all versions of the post test, practice exercises, and learning checks for each lesson.

Table 4-1. Deliverables.

4-2. Lesson Development Process. The lesson development phase begins with government approved IMDP, prototype, and storyboards.

- a. Create HTML pages containing text, graphics, and media as detailed in the approved storyboards and per the requirements described in the IMDP and illustrated in the prototype.
- b. Create SCORM metadata for each SCO.
- c. Program the product in LMS to prepare for Alpha test. See Chapter 5, Validation.
- d. Update or create lesson information in the ASAT database. To complete the POI data file, complete the following tabs: Lesson Data, Administrative Data, Terminal Learning

Objective, and Summary. In the Remarks Tab, type a statement explaining that this is a dL lesson and is all computer-based instruction.

(1) Lesson Data Tab. Enter the dL lesson title. In the Status field, select “Proposed.” In the Effective Date field, leave the default setting of 00- -0000. In the Statement field, select “FD6” from the drop-down list. In the Installation/Activity field, type “Fort Knox G2”. In the Risk Assessment Level field, select “Low.” In the Management Category field, select “Distance Learning.”

(2) Administrative Data Tab. In the Courses sub-tab, link the dL lesson to the dL course. In the Ind. Tasks Taught tab, link the task taught to the dL lesson.

(3) Terminal Learning Objective Tab. Enter the action/conditions/standards from the dL lesson into the corresponding tabs. Complete the TLO Learning Steps/Activities tab. For each learning step or activity, enter the title, security classification, method of instruction, technique of delivery (“Programmed Instruction (Instructional Strategy)),” instructor to student ratio (1:24), time category (“Academic”), and time of instruction. To complete the Time of Instruction field, allocate part of the total time for the entire dL lesson to each learning step or activity. Finally, indicate if each learning step or activity is mandatory. If the lesson has Enabling Learning Objectives (ELOs), complete the Enabling Learning Objectives tab in addition to the Terminal Learning Objective tab.

(4) Summary Tab. In the Summary Data sub-tab, select “Tutorial” to complete the Method of Instruction field. In the Instructor to Student field, type “1:24.” In the Technique of Delivery field, select “Programmed Instruction (Instructional Strategy).”

4-3. SCORM Metadata Definition and Requirements. Metadata, a critical part of the SCORM specification, is “data about data,” or information about learning content, which is entered in a structured format so the content can be easily found by users. SCORM metadata is exported by Core LS along with the other elements of the SCORM package. However, the actual metadata must be written by the content developers to describe the content so that it can be searched and reused.

Chapter 5

IMI Validation

5-1. Purpose. IMI product validation captures qualitative and quantitative data to determine that the course is:

- a. Instructionally and technically sound (design elements).
- b. Operational as designed (operability elements).
- c. User friendly (usability elements).

The specific process and timeline for validating the IMI is specified in the Training Evaluation Document, which is delivered during the Course Design phase. General requirements for the validation process are listed below.

5-2. Lesson Validation – Alpha Testing.

- a. Description. A lesson is considered complete when:
 - (1) All instructional screens are accessible and function as described in the storyboards.
 - (2) The prescriptive pretest functions as designed.
 - (3) Two versions of the posttest are available and function as designed.

The Alpha test is the initial review of a completed lesson by the government for content accuracy and adherence to the design and development standards documented in the IMDP.

- b. Personnel. Alpha testers will include training developers from the Training Development Division (TDD); SME from the course proponent unit and TDD, the National Guard, and representatives from Quality Assurance Division.

- c. Procedures.

- (1) Upon notification of delivery and a suspense date for comments by the contractor, Alpha testers will review the lesson and accompanying tests for content accuracy, functionality, and high instructional value. The project lead will provide the preferred method for receiving tester comments. Examples are a table or spreadsheet that assigns specific comments to the corresponding lesson page or emails generated by the User Feedback button in Core LS. The User Feedback button automatically assigns feedback to the lesson page that is open when the reviewer clicks the User Feedback button.

- (2) Alpha testers will submit comments to the project lead within 8 working days. The project lead will have 2 working days to collect, analyze, and consolidate reviewer comments and submit a detailed list of required revisions to the contractor.

Note: The PWS requires that the government review each delivered product and submit required revisions to the contractor within 10 working days.

(3) The contractor will notify the project lead when all lesson revisions are complete.

5-3. Alpha Revision Verification. The project lead reviews the lesson pages to verify that submitted revisions have been made. If new errors or problems are discovered during verification, further revision must be negotiated with the contractor.

5-4. BETA Testing (Student Trials).

a. The purpose of the Beta Test is to validate lesson times, verify functionality in the learning management system, and to test usability and operability of the courseware. Data collection requirements and instruments for group trials are detailed in the training evaluation document.

b. After completion of Beta testing, the government has 15 working days to submit required revisions to the contractor. The project lead will collect and analyze performance data and survey results, observations, beta testers' comments, and any other data specified in the validation plan. Based on this analysis, the project lead will document and submit required revisions to the contractor.

5-5. Validation Report. Generally, the contractor is responsible for the Validation Report. See the PWS, Section 2.5, Courseware Content Validation, and Attachment 2, Section 8.0, Content Validation. After data is collected and analyzed to determine if validation objectives were met, the contractor will develop and submit the Validation Report as described in the training evaluation document. The final report will be staffed through the chain of command to the Commanding General and provided to the proponent unit commander or commandant. The Validation Report details the results of the product validation and includes the following elements:

Element	Description
Introduction	Introduction to the document and overview of the process.
Course Information	Title. Description. Estimated length.
Participant Profile	Detailed demographics for validation participants (e.g., rank, web-based training experience, familiarity with content).
Summary	Validation objectives (from the validation plan). Collected data (e.g., pretest and posttest results, participant written validations, issue log).
Analysis	Observations, findings, and conclusions. Objective achievement assessment (based on data, observations, and findings).
Recommendations	Validation recommendations. Recommendations for revision. Associated costs and scheduled implications.
Appendix	Completed data collection instruments.

Table 5-1. Validation Report Elements.

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Chapter 6

IMI Production

6-1. IMI Production Deliverables.

Instructional Media Package and Test Package	<p>In accordance with the PWS, the Instructional Media and Test Package will be a SCORM 2004 conformant content package containing all instructions, tests, and supporting files. A content package includes all the learning resources (assets, SCOs and content aggregations, and SCORM metadata) for the courseware and is used to move those digital learning resources or collections of learning resources between LMS development tools and content repositories.</p> <p>The final content package will be delivered to the government in PIF format per the PWS.</p>
Standalone CD-ROM Version	<p>This version will play in a standalone mode via CD-ROM as specified in the DLETP PWS, Section 1.7, <u>Delivery Methods</u>. CD-ROM labeling shall be in accordance with TRADOC Pamphlet 350-70-2 (Interim Change 1).</p>

Table 6-1. Course Production Deliverables.

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Chapter 7

Technical Specifications and Requirements

7-1. Sharable Content Object Reference Model (SCORM). To ensure course material is sharable and supports a reuse strategy, the Army requires a standards-based approach to courseware development. All browser-based instruction must comply with the SCORM. For Armor proponent IMI, which currently is built to SCORM 2004 specifications, a SCO is usually defined as a task and its associated assessments. However, it is possible, and in some instances advisable, to deviate from this model. For example, it may be necessary to test a series of tasks in a culminating scenario-based assessment. In this example, the culminating assessment would be a separate SCO.

a. SCORM 2004. In SCORM 2004, the communication between a SCORM-conformant LMS and SCOs allows greater flexibility for course progression (called simple sequencing) options than were previously available in SCORM 1.2. Simple sequencing defines the manner in which the learner receives individual SCOs from an LMS.

b. Sequencing requirements and recommendations are determined by SMEs and instructional designers during the design phase and are specified in the IMDP or design plan for each course.

c. Other principles, such as designing SCOs to stand alone, depend upon the context and requirements of the courseware being created.

7-2. Learning Management System Requirements.

a. IMI developed for the Armor proponent will be delivered in the Core LS learning management system. Core LS will export content packages for all versions (SCORM 2004, CD-ROM) of the courseware necessary to meet ATSC requirements as outlined in the PWS. No SCORM tagging or function calls should be included in content delivered to be hung in Core. Core adds all SCORM requirements as part of the export process.

b. Descriptions of Core LS functionality and requirements for preparing content to be delivered in Core LS are at Appendix F.

7-3. File Naming. The Army's learning management system is Unix based and, therefore, file names used are case-sensitive. In order to speed lesson approval and prevent failures during ATSC playability testing, it is recommended that all file names contain lowercase letters exclusively.

FOR THE COMMANDER:



ROBERT L. BROOKS
Director, Information Management

RUSSELL C. CLOY
COL, GS
Chief of Staff

DISTRIBUTION:

A

Appendix A

Sample Design Documents

A-1. Lesson Map. The lesson map shows the content and sequence of the lesson in flowchart fashion.

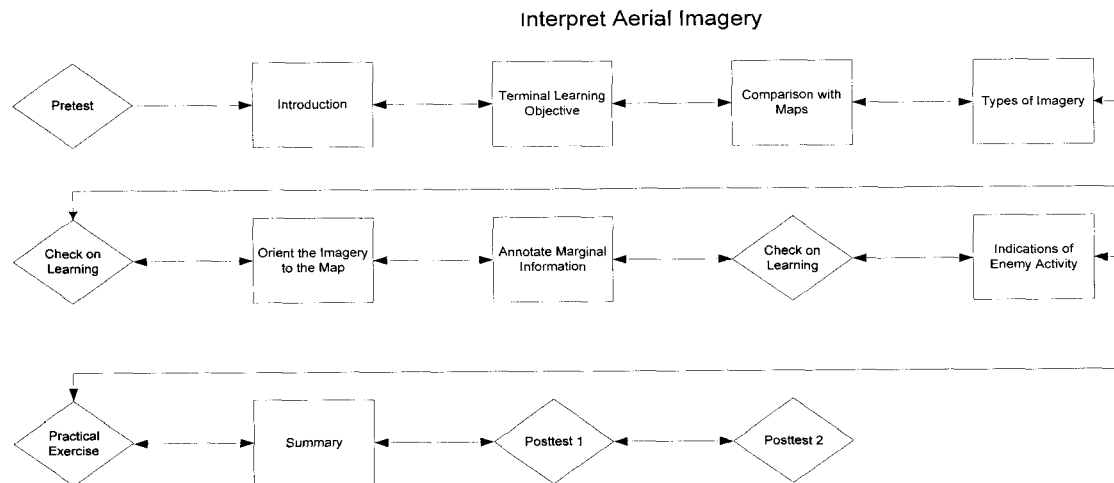


Figure A-1. Lesson Map Example.

A-2. Content Outline. Like the lesson map, the content outline shows the content and sequence for a lesson.

Interpret Aerial Imagery

1. Introduction. Importance of learning/consequences of not learning.
2. Learning Objective.
 - a. Terminal learning objective.
 - b. Estimated time to complete lesson.
3. Comparison of Aerial Imagery to Maps.
 - a. Definition. An aerial image is any photograph taken from an airborne platform.
 - b. Advantages of Aerial Imagery (as compared to maps):
 - (1) It may be in the hands of the user within a few hours after it is taken.
 - (2) It shows military features that do not appear on maps.
 - (3) It can provide a day-to-day comparison of selected areas.

c. Disadvantages of aerial imagery (as compared to maps):

- (1) Ground features are difficult to identify or interpret without symbols.
- (2) Position location and scale are only approximate.
- (3) It lacks marginal data.

4. Types of Aerial Imagery.

a. Type of aerial photograph depends on angle of the camera with respect to the earth's surface when the photograph is taken.

b. Vertical (Show example.).

- (1) Camera is pointed as straight down as possible.
- (2) Characteristics.
 - (a) Depicts a relatively small area.
 - (b) Usually appears as a square or rectangle.
 - (c) Gives an unfamiliar view of the ground.
 - (d) Relief (ground contour) is not readily apparent.
- (3) Use. Can supplement old maps by providing updated information.

c. Oblique (Show examples of both high and low.)

- (1) High Oblique. Camera is inclined about 60 degrees from the vertical.
- (2) High Oblique Characteristics.
 - (a) Covers a large area.
 - (b) View varies from familiar to unfamiliar.
 - (c) Distances and directions are not measured.
 - (d) Relief is not apparent.
 - (e) Always shows horizon.
- (3) High Oblique Use. Can be used to supplement a map.

(4) Low Oblique. Camera is inclined about 30 degrees from the vertical.

(5) Low Oblique Characteristics.

(a) Covers a small area.

(b) Views are familiar.

(c) Relief is discernible but distorted.

(d) Distances and directions are not measured.

(e) Never shows horizon.

(6) Low Oblique Use. Low oblique photographs can be used to supplement a map, study an area before an attack, and/or to substitute for a reconnaissance.

5. Learning Check.

6. Orienting Aerial Imagery to the Map. Determine north by orienting the photograph with a recognizable feature on the map.

7. Annotating Marginal Information.

a. What you annotate depends on your mission and how much data was supplied with the photograph; annotations are for your use.

b. If you plot a non-standard object on the photograph, show it in the marginal information.

8. Learning Check.

9. Analyzing Aerial Images for Signs of Enemy Activity.

a. Compare aerial images to previous photographs and look for patterns that do not conform to the surrounding area.

b. Three types of patterns:

(1) Vehicle tracks forming irregular patterns.

(2) Construction sites.

(3) Communication activities.

10. Practice Exercise.

11. Summary.

A-3. Assessment Strategy. The lesson map or content outline should be accompanied by a brief document explaining the assessment strategy for the lesson.

Evaluation Plan


Provide real situations, illustrations, and if necessary, animations to assess the following:

- a. Calculate and designate placement of timber cutting charges.
- b. Calculate and designate placement of steel cutting charges.
- c. Calculate and designate placement of breaching charges.
- d. Calculate and designate placement of cratering charges.


A-4. Storyboards. The following storyboards illustrate various approaches:

<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <div style="display: flex; justify-content: space-between;"> file/screen name _____ </div> <div style="background-color: yellow; height: 100px; margin: 10px 0;"></div> <div style="display: flex; justify-content: space-between;"> you are here map _____ </div> </div> <div style="margin-top: 10px;"> Description: _____ Flash file: _____ Text file: _____ Graphics file: _____ Next link: _____ Previous link: _____ </div>	<div style="margin-bottom: 10px;"> Revision date: _____ Signatures: <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; border-bottom: 1px solid black;">Programmer</td> <td style="width: 50%; border-bottom: 1px solid black;">Lead ID</td> </tr> </table> </div> <div style="margin-bottom: 10px;"> Feedback file: <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; border-bottom: 1px solid black;">Correct</td> <td style="width: 50%; border-bottom: 1px solid black;">Distracter 1</td> </tr> <tr> <td style="width: 50%; border-bottom: 1px solid black;">Distracter 2</td> <td style="width: 50%; border-bottom: 1px solid black;">Distracter 3</td> </tr> </table> </div> <div style="margin-bottom: 10px;"> Terms for glossary: <table style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 50%; border-bottom: 1px solid black;"> </td><td style="width: 50%; border-bottom: 1px solid black;"> </td></tr> <tr><td style="width: 50%; border-bottom: 1px solid black;"> </td><td style="width: 50%; border-bottom: 1px solid black;"> </td></tr> </table> </div> <div style="margin-bottom: 10px;"> Multimedia files and scripts: <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; border-bottom: 1px solid black;">Audio</td> <td style="width: 50%; border-bottom: 1px solid black;">Video</td> </tr> <tr> <td style="width: 50%; border-bottom: 1px solid black;">Animation</td> <td style="width: 50%; border-bottom: 1px solid black;">Other</td> </tr> </table> </div> <div> Use back of page for additional notes: _____ </div>	Programmer	Lead ID	Correct	Distracter 1	Distracter 2	Distracter 3					Audio	Video	Animation	Other
Programmer	Lead ID														
Correct	Distracter 1														
Distracter 2	Distracter 3														
Audio	Video														
Animation	Other														


There are several ways to administer drugs via the intravenous route. Here are three of the most common methods.



IV Piggyback ▶ 45



IV push ▶ 50




Infusion ▶ 55

Notes: Link graphics and legends to screen indicated. Leave some space between 3 graphics.

Screen #80
Back Link: 70
Forward Link: 85
Graphic Name: bpc.jpg
push.gif infusion.gif
Video Link:
Audio Link:

Screen View:

1 The management and staff of the XYZ company would like to welcome you as a new employee.



4 **Audio Script:**
The management and staff of the XYZ company would like to welcome you as a new employee.

5 **Production Title:** Orient
Screen #: 3

Production Notes:

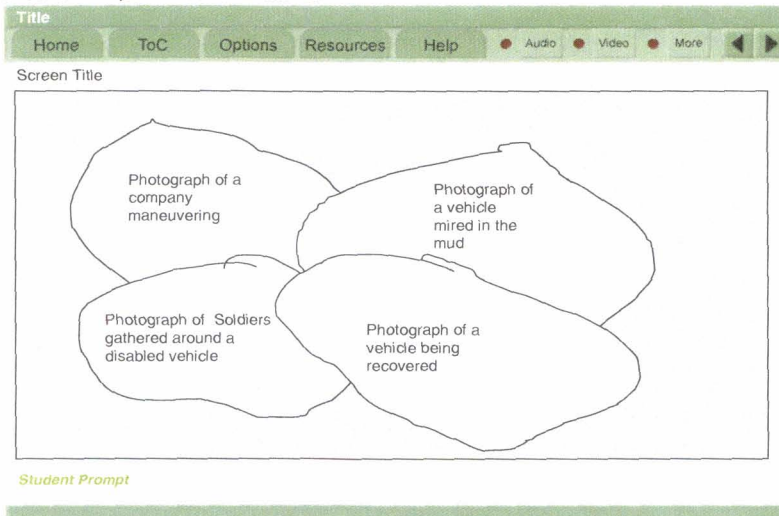
2 Lt. Blue Background
Pic. #3

Branching Instructions:

3 Branch to 4

In the following storyboard example, the customer or course proponent can view additional information in the notes view or handout view in PowerPoint.

Whole screen objects without screen sub title:



{SCO Name}
bmoc_s002_conduct_recovery_operations

{Template Name}
oes_1000x700_flash950x500

{Page Name}
IntroductionCRO1

{Title}
Conduct Recovery Operations

{Screen Title}
Conduct Recovery Operations (Introduction)

{Screen Text}
{Student Prompt}
Click on NEXT to continue

{Graphic File Name Path}
Z:\source_library\bmoc\s002_conduct_recovery_operations\k0345_introductioncro1.swf

{Graphic Source Path}
Z:\source_library\bmoc\s002_conduct_recovery_operations\k0345_introductioncro1 fla

{Media Notes}
The background for all of these pages should be the same; a photograph of a vehicle being recovered with a recovery vehicle.
Photographs of a company maneuvering, a vehicle mired in the mud, Soldiers gathered around a disabled vehicle, and a vehicle being recovered. Photographs appear in that order, partially overlapping each other. Photographs appear spaced a few seconds apart as the narration plays.

{Narration}
audio_k0345
A unit's combat power is largely determined by the number of combat vehicles it has operational and ready. As vehicles are damaged or become incapacitated on the battlefield, combat power is decreased; units must make every effort to bring these vehicles back into an operational, combat-ready condition. One way the maintenance officer contributes to maintaining combat power is through recovery operations.

{SCORM Description}
Introductory information for the Conduct Recovery Operations lesson

{SCORM Keywords}
Introduction, recovery, operations, conduct

{Safety Alert}

{Previous Page} go to Previous Page

{Next Page} go to Next Page

The storyboard example below shows previous page and next page information in the white space at the top of the slide and shows additional information in the notes view or handout view in PowerPoint. The page name is shown in the lower left corner of the slide.

soso_image_05 soso_image_07

Interpret Aerial Imagery
Back
Next

User Feedback
Student Center
Lessons Available
Bookmark

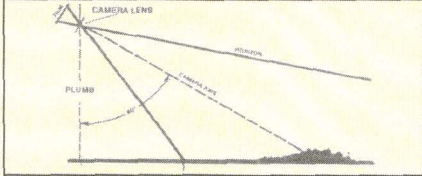

High Oblique Photograph

High oblique imagery is taken with the camera inclined about 60 degrees from the vertical, as shown in the picture on the right.

A high oblique photograph:

- Covers a large area.
- View varies from familiar to unfamiliar.
- Distances and directions not measured.
- Relief is not apparent.
- Always shows the horizon.

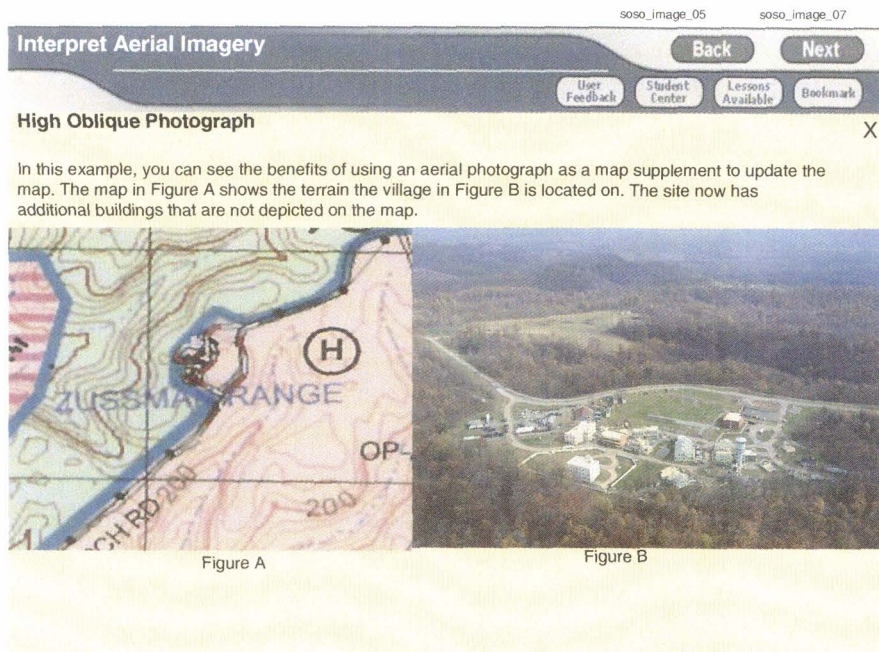
Click [photograph](#) to see how to use a high oblique aerial photograph.

soso_image_06

Note: Artist will enhance the diagram to make the lines more crisp. When the learner clicks the blue text, a separate window is displayed.

The following storyboard shows what the learner will see after clicking the blue text in the previous storyboard example. The customer or course proponent can view additional information in the notes view or handout view in PowerPoint.



Note: This pop-up window will display when the learner clicks the blue text on page 6. To close the pop-up window, the learner will click the close (X) button in the upper right corner of the window (The lesson toolbar will not be displayed on pop-up windows.)

Appendix B

Test Item Requirements and Guidelines

B-1. Multiple Choice.

- a. Develop one stem, one correct answer, and three realistic distracters (e.g., a, b, c, d).
- b. Keep the correct answer and the distracters brief and similar in grammatical structure and word length.
- c. Avoid using negatives (e.g., no, nor, not, none) in any part of the multiple choice item.
- d. Vary the correct answer position to avoid establishing an answer position pattern (e.g., “c” is generally correct).
- e. Don’t use inclusive or exclusive answers or distracters (e.g., all of the above, none of the above, both a and b).
- f. List alphanumeric responses in ascending order; all others will be in alphabetical order.
- g. Capitalize the first word at the beginning of each answer and distracter when the stem is a question. If the answer is a continuation of the stem, use initial lowercase.
- h. Avoid repeating initial words in the responses. Load repetitive initial words into the stem (e.g., If “the” is the first word in each response, move it to the stem.)
- i. Provide feedback indicating whether the response is correct or incorrect and explain why.

1. Which step of the target acquisition process categorizes a potential target by the relative level of danger it represents?

<input type="checkbox"/>	Identification.	a.
<input type="checkbox"/>	Classification.	b.
<input type="checkbox"/>	Location.	c.
<input type="checkbox"/>	Crew Search.	d.

Figure B-1. Incorrect Multiple Choice Example. Why?

B-2. Completion.

- a. Design flexible answer analysis. Anticipate answer variations (e.g., common spelling errors, abbreviations, acronyms). Use of completion questions in pretests and posttests is discouraged because of the difficulty in system grading.
- b. Provide specific feedback indicating whether the response is correct or incorrect and explain why.

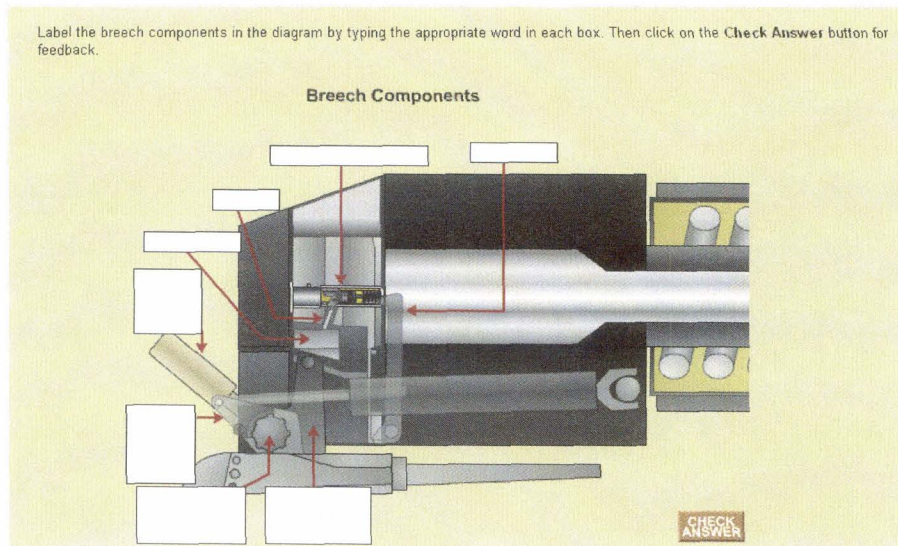


Figure B-2. Completion Example.

B-3. Scenario-based. A scenario is a visual or verbal setting that provides a context for the learner to apply knowledge or skills. It usually includes simple assessment items and requires multiple screens. Guidelines for developing scenarios include:

- a. Keep the text or graphic description (e.g., event, situation, environment) brief.
- b. Ensure information (e.g., names, data, dates) is accurate and consistent on all scenario screens.
- c. Choose examples that are realistic based on the instructional content.
- d. Develop related questions according to simple assessment item guidelines.

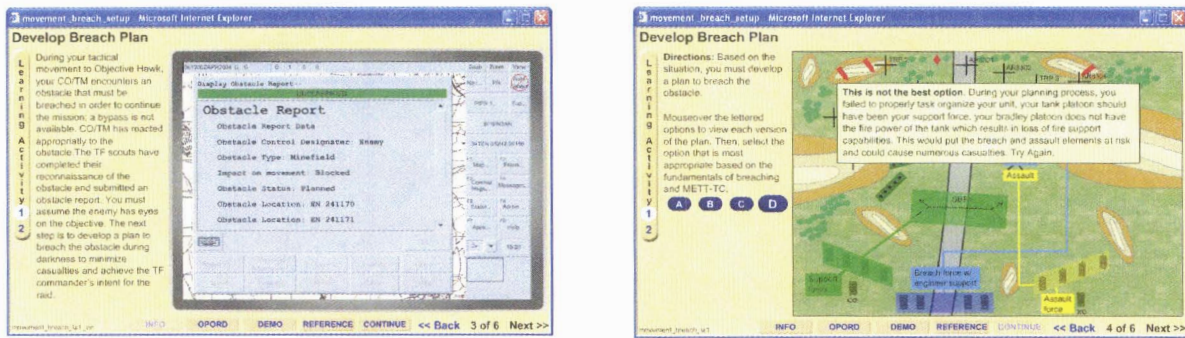


Figure B-3. Scenario.

B-4. Simulation-based Assessment. A simulation is a multimedia setting that provides a context for the learner to perform the physical steps of task. Guidelines for developing scenarios include:

- Clearly define the simulation parameters.
- Define and document development requirements.
- Ensure simulations function like the actual system, equipment, or environment.
- Design complex simulations for maximum learner flexibility and customized feedback.

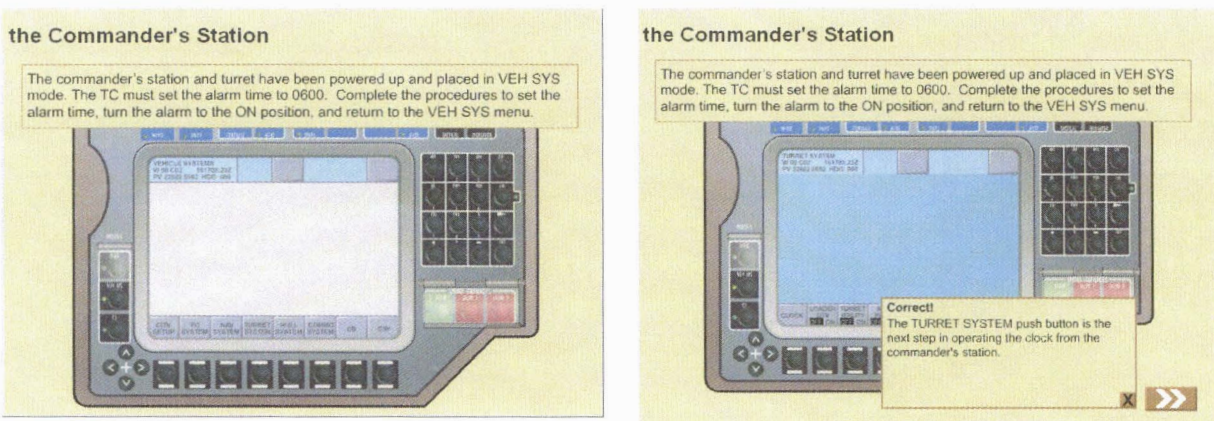


Figure B-4. Simulation.

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Appendix C

Interactivity Levels

C-1. Definitions of Interactivity Levels.

Description	Example Verbs	Guidelines
In Level 1, the learner receives information. This level is used primarily to introduce knowledge, including ideas, concepts, and processes. Information is generally provided in a linear format (one idea after another). Minimal interactivity is incorporated in the form of text, navigational icons, static graphics (e.g., photos, charts, tables) and illustrations, learner-initiated animations, and pop-ups and hyperlinks.	No assessment required in Level 1.	<ul style="list-style-type: none"> • Provide interaction opportunities appropriate to the content. • Avoid mandatory interactions that are superficial.
In Level 2, the learner recalls information and responds to instructional cues. This level is used to introduce simple operational and maintenance guidelines and procedures. Information can be presented in a linear manner, but the learner has some control over the presented material. Limited to moderate interactivity is incorporated in the form of user-initiated animations, interactive graphics, activities, scenarios, and assessments (practices, knowledge checks, and tests).	Identify Choose Select Isolate List Match Recognize Distinguish Label	<p>In addition to guidelines for Level 1:</p> <ul style="list-style-type: none"> • Group content appropriately. • Ask relevant questions without interrupting the continuity of the instructional flow. • Provide brief summaries and periodic reviews. • Include relevant feedback for practices and assessment questions.
In Level 3, the learner applies information to scenarios and interacts with simulations. This level is used to present more complex operational and maintenance procedures. Information is often non-linear and the learner has moderate control over the presented information. Moderate to high interactivity is incorporated in the form of complex interactive graphics, including simulations and decision-based branched scenarios.	Compute Solve Categorize Organize Arrange Combine Complete Predict	<p>In addition to guidelines for Levels 1 and 2:</p> <ul style="list-style-type: none"> • Design questions that require the application of knowledge, skills, and attitudes. • Design questions that combine and integrate multiple elements.

Description	Example Verbs	Guidelines
<p>In Level 4, the learner engages in a life-like set of complex cues and responses. This level is used to simulate highly complex operational and maintenance procedures that often support certification. Maximum flexibility and multi-level branching allow a high degree of interactivity in the form of simulator and gaming environments.</p>	<p>Operate Manipulate Assemble Adapt Compare Rearrange Build</p>	<p>In addition to guidelines for Levels 1, 2, and 3:</p> <ul style="list-style-type: none"> • Allow the learner to discover information through active exploration. • Provide the maximum flexibility for user control and exploration.

Appendix D

Validation Elements

D-1. Design Elements.

Element	Description
Content	<ul style="list-style-type: none"> • Content is relevant, thorough, and well organized. • Content is current and accurate. • Content is appropriately displayed. • Writing style is appropriate and consistent.
Assessments	<ul style="list-style-type: none"> • Assessments are consistent with the learning objectives. • Assessments are the appropriate level of difficulty based on the content. • Feedback and remediation, when appropriate, is clear and correct. • Distracters are plausible.
Graphics/ Animations	<ul style="list-style-type: none"> • Graphics and animations are used appropriately and support the content. • Animation instructions are clear.
Audio/Video	<ul style="list-style-type: none"> • Audio/video supports the content. • Audio text is well written. • Video is acceptable quality.
Style/Layout	<ul style="list-style-type: none"> • Screen formatting and placement is consistent. • Text is easy to read. • Highlighting effects are used appropriately. • Titles are consistent and accurate.

D-2. Function Elements.

Element	Description
LMS Environment	<ul style="list-style-type: none"> • Users are able to logon and access the course. • Course elements are presented per prescribed course sequencing. • Bookmarking is operational. • Performance data is tracked and captured. • Printing capability is available and operational.
Navigation/ Branching	<ul style="list-style-type: none"> • Navigation within each SCO works correctly. • User prompts are correct for each screen. • When multiple prompts appear on a screen, the prompts are coordinated with screen content.
Audio/Video/ Animations	<ul style="list-style-type: none"> • All audio/video/animation operates as designed. • Audio volume is consistent.

Style/Layouts	<ul style="list-style-type: none"> • Screen titles and subtitles are correct for each screen. • Layouts and screen designs are consistent with templates. • Graphic and animation styles are consistent throughout the course. • Instructional content is consistent with guidelines specified in the IMDP. • Content is free of typos, grammatical errors, and punctuation errors.
Assessments	<ul style="list-style-type: none"> • Test, knowledge check, and practice feedback function correctly. • Appropriate feedback is tied to assessment items. • Scoring functions correctly.
Remediation	<ul style="list-style-type: none"> • Remediation functions operate correctly.

D-3. Usability Elements.

Element	Description
LMS Environment	<ul style="list-style-type: none"> • Logon instructions are clear, and the course is easily accessible. • Navigation among SCOs is easily understood and used by learners without excessive explanation. • Bookmarking is operational and easy to use. • Printing is intuitive and requires little direction. • Performance data is easy to access and accurate.
Navigation and Hyperlinks	<ul style="list-style-type: none"> • Navigation buttons and menus are easy to locate and use. • User prompts provide clear direction. • Hyperlinks are recognizable. • Pop-up boxes are conveniently placed and easy to close.
Glossary/Help	<ul style="list-style-type: none"> • Glossary terms are adequate and informative. • Help content is complete and easily understood.
Audio/Video/Animations	<ul style="list-style-type: none"> • Audio/video/animations are easily controlled and operate smoothly. • Audio volume is consistent.
Style/Layouts	<ul style="list-style-type: none"> • Text is readable and well-written. • Look and feel is consistent and pleasing. • Gender-neutral terminology is used consistently.
Screen Titles and Breadcrumbs	<ul style="list-style-type: none"> • Screen titles and breadcrumbs clearly identify relative location. • Titles are meaningful.
Assessments	<ul style="list-style-type: none"> • Directions are clear. • Feedback is specific, helpful, and positive. • Answer submission procedures are clear. • Remediation is related to the content and adds value.

Appendix E
Sample ALPHA Test Feedback

Troop Leading Procedures - Alpha Comments (6 June 2005)	
Page	Comment(s)
Pretest	Delete questions 1 & 7. Renumber remaining questions.
c2_tlp_02_obj	Move up the word “Standards” in the Action/Conditions/Standard table.
c2_tlp_05	In Service Support rollover, add comma after materiel & delete “and”.
c2_tlp_08	In first sentence of What? Rollover change from “...actions will be taken by the element...” to “...actions the element will take...” In Why? rollover, change “Sgt” to “SSG”.
c2_tlp_09_cl	Do away with sliding bar; change directions to reflect the changes like this: Answer the following question by clicking the correct response. change answers to: a. When and what. b. Where and what. c. Who and what. d. Why and what.
c2_tlp_16	Make graphic round, not elliptical. Enlarge text in the graphic.
c2_tlp_17	Simplify sketch; it should only be a sketch of the area and the planned move.
Post test 1	Delete questions 1 and 10. Renumber remaining questions.
Posttest 2	Delete questions 1 and 7. Renumber remaining questions.
	After first posttest, I am being redirected to the pretest instead of the first page of the lesson. Should go to first page of lesson.

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Appendix F

Core LS

F-1. Functionality. Core LS provides a number of standard functionalities which can be utilized by any courseware hosted in Core LS. Some of these are recommended for use in all courseware, while others are optional. However, it is important that if a functionality already exists in Core LS, the Core LS functionality must be used rather than creating a duplicate functionality in the courseware. Utilizing these functionalities in Core LS not only allows the fullest and most effective functioning in Core LS but also allows Core LS to export those behaviors to the fullest extent possible in SCORM packages or to CD-ROM.

F-2. Testing and Evaluation. Testing and evaluation standards are defined in paragraph 1.3.2, Assessment. Of the four types defined, two (Pretest and Posttest) are required to be scored and graded by Core LS. This requires either the use of Core LS Test Functionality or the creation of Test Functionality that passes its information to Core LS. The other two types (Practice and Knowledge Checks) are not required to be scored and graded by Core LS. These are treated as “black boxes,” whose behavior is self-contained and not known by the LMS, and must follow the same guidelines as any other content page. However, content designers may wish for results in Practices or Knowledge Checks to create LMS-controlled navigational options for students.

F-3. Core LS Test Functionality.

- a. Core LS includes a robust testing suite for use of standard question types:
 - (1) Multiple Choice.
 - (2) True-False.
 - (3) Matching.
- b. These question types can be delivered as a series of test versions (e.g., a posttest delivers A on first attempt, B on second, etc.,) or as a single version with questions given in a scrambled order. These question types can be pooled, and a test will draw from them randomly.
- c. If using the Core LS testing system, the test behaviors in F-3(e) are available to any test. These behaviors exist as “check boxes,” which are attributes of the test type. When the list below notes that checking one box causes another to be checked or unchecked, this means that choice of the behavior is associated with another behavior, which must be enforced.
- d. Core is also able to use Flash animations in tests using the Core LS test functionality described above. In order to do this, each test question must be in a separate Flash file, and each Flash file must be delivered within a discrete HTML page. This HTML page will include JavaScript to pass values to the Core LS exposed Application Program Interface (API) using syntax provided by the Core LS team. (Note that the material passed from the Flash is simply the answer choice and not a correct/incorrect score or grade; scoring and grading are done in

Core.) Flash animations delivered in this way can use the standard Core functionality described here, including the ability to test out by subsection.

e. The available test behaviors are as follows:

(1) Test Appears in New Window. Test item appears in pop-up window rather than in main flow. If this is checked, “User Must Pass Test” is unchecked.

(2) Keep User Answers. Database stores student answers for later use and/or display. If this is unchecked, “Allow Testing Out of Lesson and Keep User Scores” are unchecked.

(3) Keep User Scores. Database stores student scores for later use and/or display. If this is checked, “Keep User Answers” is checked. If this is unchecked, “Allow Testing Out of Lesson” is unchecked.

(4) Test Repeatable. Test reappears and is taken again each time student passes through test location. Non-repeatable tests do not reappear after completion.

(5) Scramble Test Questions. Questions assigned to test are given in random order to each student. This does not prevent the system from remembering this random order so that it can reproduce the student experience for later display.

(6) Give End-of-Test Feedback. Give feedback on test performance to student after completion of test. If this is checked, “Keep User Answers and Keep User Scores” are checked.

(7) User Must Pass Test. In order to complete the test (to make a non-repeating test stop appearing and satisfy a gate requirement), the student must meet or exceed the defined passing score. If this is checked, “Test Appears in New Window and Give Skip Test” button are unchecked, and “Keep User Answers and Keep User Scores” are checked.

(8) Show User’s Correct Answers. When giving student feedback, display correct answers and student’s answers. If this is checked, “Keep User Answers” is checked.

(9) Show User Question by Question Feedback. Show test feedback in a progressive, question-by-question fashion and typically used in practical exercises/practices but not in tests for record.

(10) Give Reference Text and Link. When giving student feedback, provide text citing the material pertaining to the question and a link to that material.

(11) Give Skip Test Button. Provide a button allowing the student to skip a test. If this is checked, User Must Pass Test is unchecked.

(12) Give Question Specific Feedback. Provide feedback text unique to the individual question.

(13) Allow Testing Out of Lesson. Allows student to satisfy gating requirements for lesson completion by scoring higher than a defined “test out” score on a pretest. If this is checked, “Keep User Answers and Keep User Scores” are both checked, and “Test Appears in New Window” is unchecked. See also test out by subsection, below.

(14) Show Before Test Message for Non-repeating Tests. Provide an announcement screen that informs a student he is about to go into a test or has already satisfied the requirement if the test is completed.

(15) Give a User Feedback Button for Test Questions. Provides a button for the student to send course feedback from within a test that provides unique question ID stamp.

(16) MultiTest. Makes test a parent for a set of equivalent children tests that may be delivered in lieu of each other.

f. Additionally, Core LS pretests can be set up to allow students to test out of specific sections or ELOs of the lesson. This requires the test writers to provide information on which questions are linked to which subsection/ELOs. A 100 percent on all questions associated with an ELO will allow a student to skip that subsection (although the student will have the option to review it).

F-4. Non-core Test Functionality. Content providers may choose to develop pretest and posttest functionality that does not use the traditional formats described above, but it creates complex animations that allow students to make choices. Where this functionality is required to pass results for scoring and grading to Core LS, it must do so via JavaScript to the Core LS exposed API using syntax as provided by the Core LS Team. However, depending on how this testing material is provided, it may not be able to utilize some or all Core LS test functionality.

F-5. Delivering Content for Core LS.

a. Content delivered for hanging in Core LS consists of, at a minimum, a collection of HTML pages and an accurate lesson map showing how the pages are to be delivered.

b. For multimedia files contained on the HTML pages, there are simple requirements on file structure.

c. Tests must be delivered in electronic format with an answer key.

F-6. Content Format in Core LS.

a. Core LS delivers course content within a frameset. This frameset consists of several Core LS controlled frames which allow dynamic information to be displayed, including one or more toolbars. The largest portion of the frameset is the content frame. This is the area developed by the content providers and consists of a simple HTML page containing content including text, graphics, audio, video, or animation.

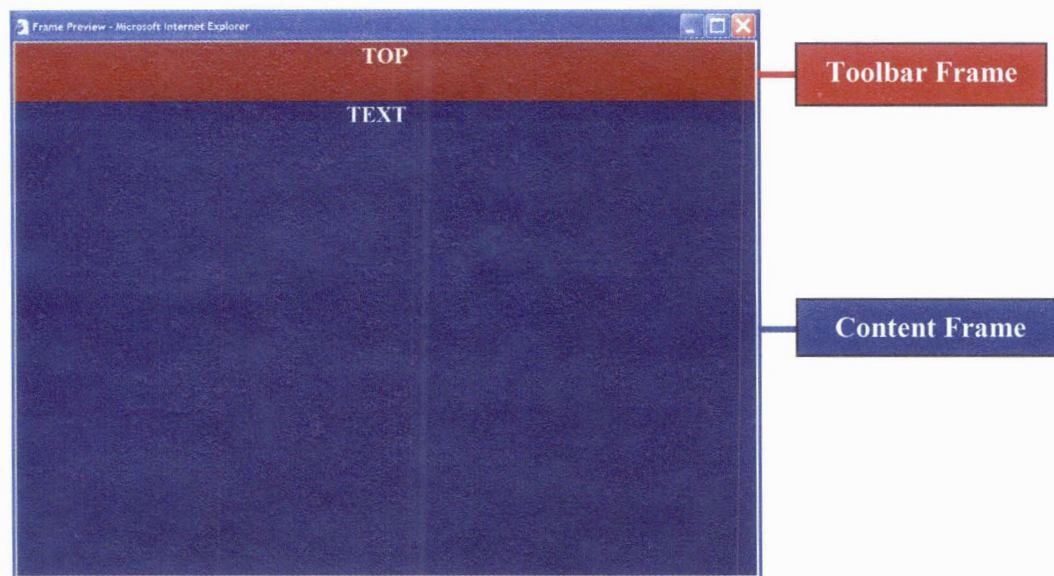


Figure F-1. Blank Frameset.

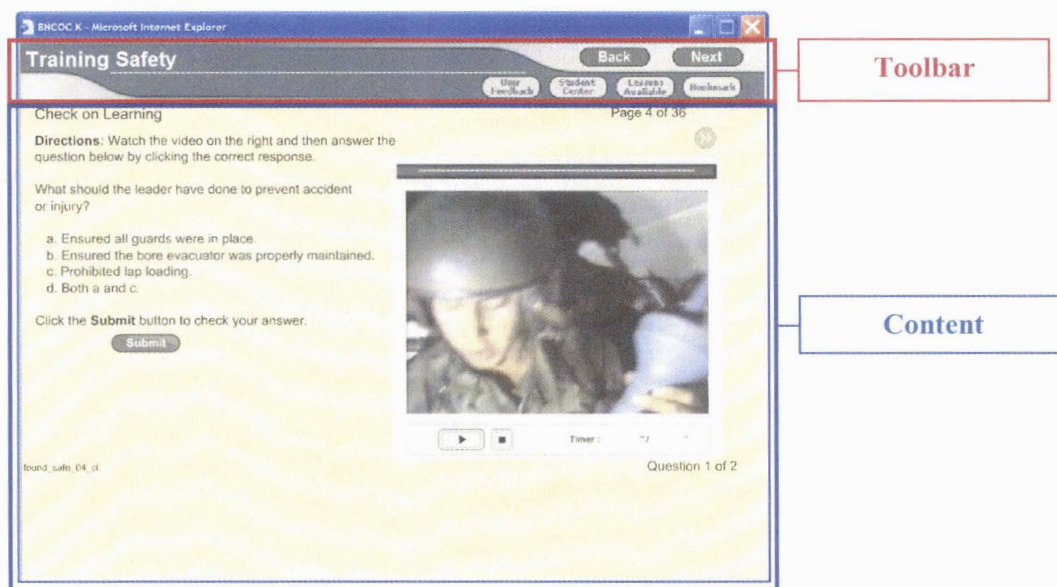


Figure F-2. Core LS Frameset Example Page.

b. If the content developers desire for the content pages to trigger an event in the LMS, the HTML pages can contain JavaScript that sends information to the Core LS exposed API. For example, such scripts could send evaluation scores from Flash animations, trigger navigation to next or previous page, etc. The syntax for this JavaScript is provided by the Core LS team.

F-7. Core LS Toolbar.

a. The first consideration for designing for Core LS is the toolbar, which includes all LMS-provided navigation and other functionality. Choosing which Core LS buttons will be included in the toolbar is one of the most important considerations in content design.

b. Required Buttons. Some buttons are required because their functionality is embedded in the LMS and export functions. These buttons are:

(1) Forward (Next Page).

(2) Back (Previous Page).

(3) Lessons Available. Takes student to table of contents of entire course.

(4) User Feedback. Sends e-mails to instructor and feedback panel, with date-time stamp and stamp of page sent from, allowing the user to comment on page.

c. Recommended Buttons.

(1) Student Center. Opens pop-up window that consolidates a number of optional functions, generally including Where Am I, Course Map, Group Progress, Student Progress, Search, Internal Messaging, and Password Management.

(2) Bookmarking. Allows student to create and manage bookmarks in the courseware. Students can bookmark any page in the courseware and use this functionality to return to it. Can also name/rename and delete bookmarks.

d. Optional Buttons. These buttons are available and may be placed on the toolbar if required for the courseware. Many of these buttons are routinely placed in the Student Center.

(1) Where Am I. Appears in pop-up window. Shows student location of current lesson within the course as a whole. Generated by LMS in real time.

(2) Course Map. Appears in pop-up window. Shows student the structure of the course, down to the page level. Generated by LMS in real time. This tool also allows the student to view any of the pages available to him which will open in this window. This allows review of material without losing the student's place in the main flow.

(3) Group Progress. Opens pop-up window to show student the progress through course of all students in his group.

(4) Student Progress. Opens pop-up window to show student his progress through the course and all of his test scores to date.

(5) Search. Allows student to do text search of all public courseware hung in the Core LS site. Typically used for not-for-record self-development mode.

(6) Tips/Hints/Explanations/Examples. Buttons which can be added to toolbar to allow supplemental materials to be associated with main page. New buttons can be created with their own names to allow access to maps, resource materials, etc.

(7) Glossaries/FAQ. Links to glossaries or other reference pages created by content provider.

(8) Internal Electronic Messaging. Gives student access to an instant messaging utility that allows him to communicate with instructors and other students in the courseware. These messages are accessed from within Core LS and do not generate e-mail.

(9) Threaded Discussion. Allows access to a threaded discussion area.

e. Other Toolbar Elements. Core LS can generate other dynamic material for display in the toolbar. These include the following:

(1) Lesson Title.

(2) Breadcrumbs.

f. Custom Buttons. Courseware designers can specify new buttons to be included in the Core LS toolbar to access routine information from each content page. An example of this is the Staff Center button in ACCC Revision project, which holds references, orders, maps, overlays, and other tactical products used in the course.

g. Non-core Buttons. Some buttons do not fall under the control of the LMS and do not belong in the Core LS toolbar, but rather in the content area. These include buttons for the control of media elements, such as “Play,” “Rewind,” “Pause,” “Stop,” “Show Script,” etc.

(1) Note that the course look-and-feel can be designed so that these buttons fall into an area that appears to the user to be contiguous with the toolbar.

(2) Buttons internal to an animation or video should be labeled differently than those on the toolbar to avoid confusion. For example, to move a student forward through an animation, use “Continue” rather than “Next.”

Appendix G

Recommended IMI User Interface Template

G-1. User Interface. Using a common interface simplifies and standardizes the course graphic user interface. Below is the current approved user interface template for Armor IMI.

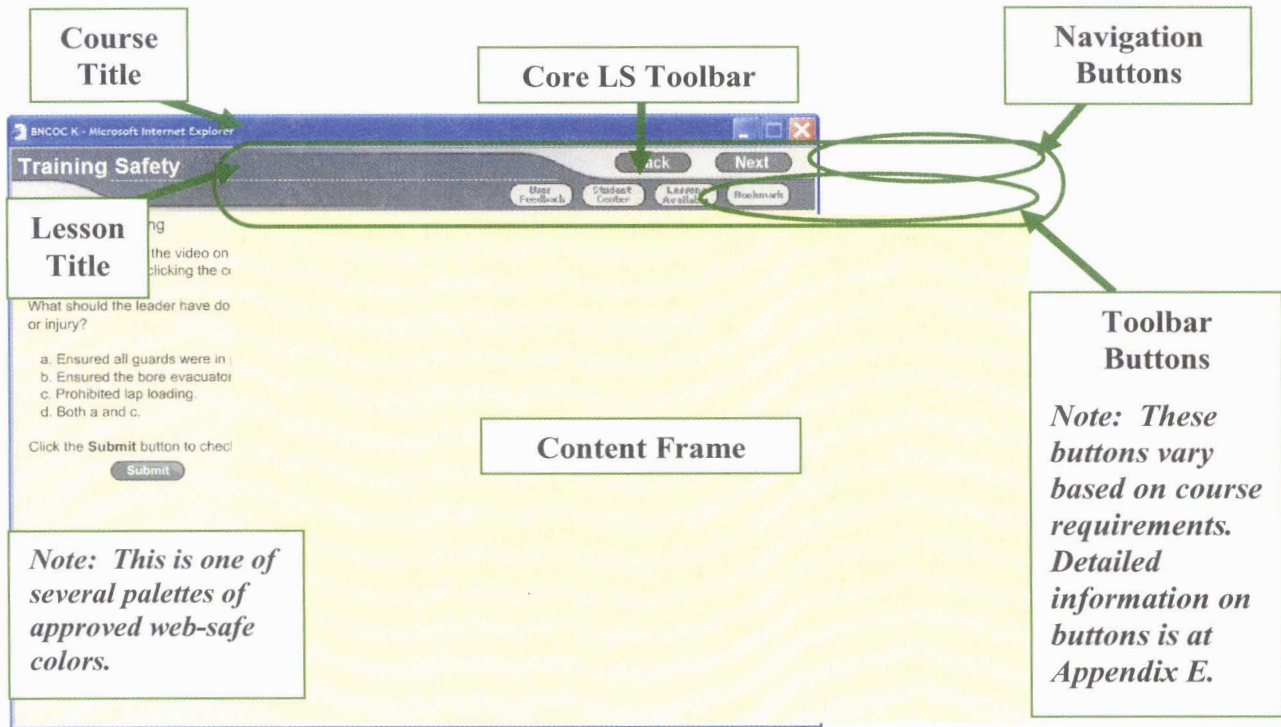
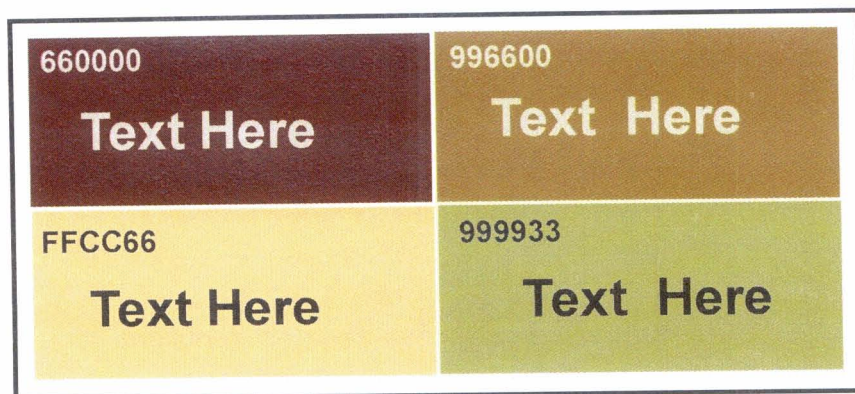
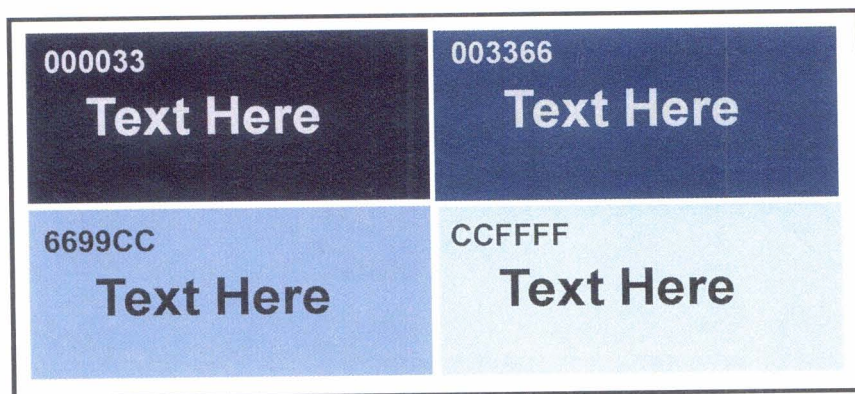


Figure G-1. User Interface Template.

G-2. Web-safe Colors. The industry standard palette for IMI delivery is 216 web-safe colors. These colors display exactly the same on any computer. In Figure F-2, we have chosen four sets of web-safe color combinations and standard yellow, red, green, black, and two shades of gray to use in Armor IMI.



Four Sets of
Web-Safe
Color Combos
for DL Design



Use these
Yellow,
Red,
Green, and
Grays when
needed in
content

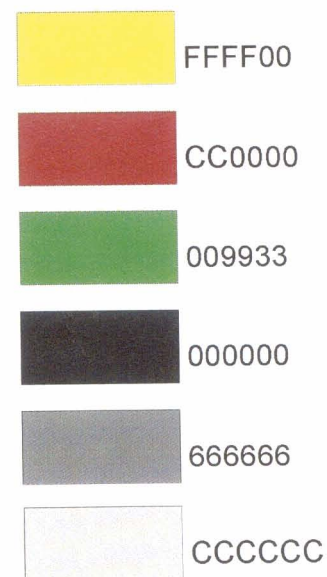
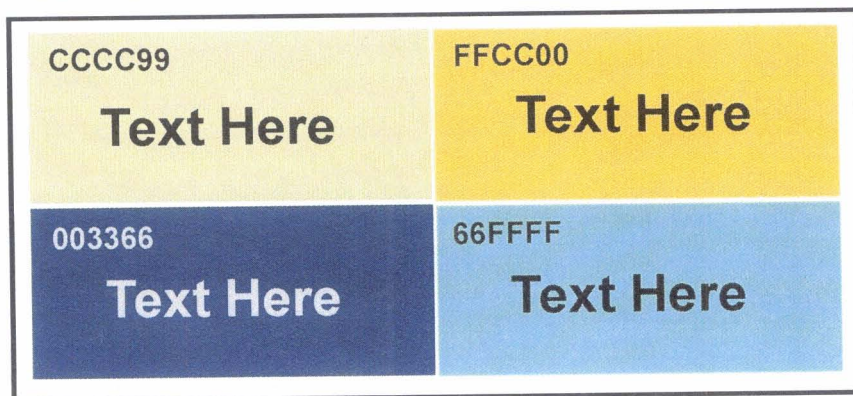
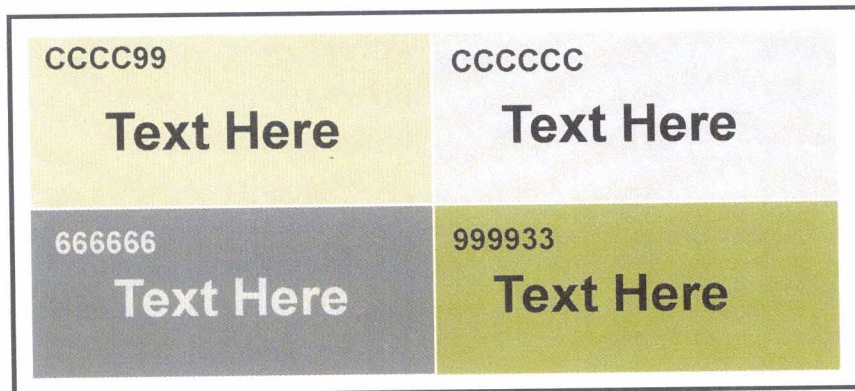


Figure G-2. Web-Safe Color Combinations.

Appendix H

Graphics: Types, Uses, and Interactivity Consideration

Type of Graphic	Considerations	Learner Interaction
<p>Simple static graphics are still pictures or information including:</p> <ul style="list-style-type: none"> • Photographs. • Clipart. • Charts. • Process flows. • Documents. • Diagrams. • Information tables. 	<p>Simple static graphics can be used when the SME can provide existing course-related graphics or when royalty-free libraries are available.</p>	<ul style="list-style-type: none"> • Low level of learner interactivity. • Learner views graphic.
<p>Complex static graphics are 2D or 3D still illustrations including:</p> <ul style="list-style-type: none"> • Machinery diagrams. • Mechanical drawings. • Custom scenes/themes. 	<p>Complex static graphics can be used when:</p> <ul style="list-style-type: none"> • A unique perspective on an environment or object is required. • Adequate detail is unavailable in existing photos or graphics and additional references are required. 	<ul style="list-style-type: none"> • Low level of learner interactivity. • Learner views graphic.
<p>Complex animations are 2D or 3D graphics with detailed or moving elements including:</p> <ul style="list-style-type: none"> • Animated characters. • Synchronous audio (sound effects or narrative). • Specialized environments/scenarios • Realistic equipment functions. 	<p>Complex animations can be used when:</p> <ul style="list-style-type: none"> • An environment is difficult, impossible, or too costly to portray through other media options. • Consequences of use result in dangerous situations such as those caused by explosions, fire, water, smoke, or equipment could cause harm. • Graphic reuse can be optimized (whole or part). • SME can provide detailed information and references to ensure graphic development efficiency and accuracy. 	<ul style="list-style-type: none"> • Limited level of interactivity. • Learner initiates animation.

<p>Simple interactive graphics are 2D or 3D graphics that provide learning opportunities using discovery techniques or skill practice including:</p> <ul style="list-style-type: none"> • Role playing scenarios. • Simple decision-based scenarios. • Simple software simulations. • Image maps with multiple pop-ups. • Simple object manipulation. 	<p>Simple interactive graphics can be used when:</p> <ul style="list-style-type: none"> • Relating instructional content to a visual environment can enhance learner retention. • Application of knowledge in a visual-based scenario is required. • Controlled exploration of an object or environment is appropriate. 	<ul style="list-style-type: none"> • Moderate level of interactivity. • Learner discovers and responds.
<p>Complex interactive graphics are 2D or 3D graphics that provide high-level learning opportunities using discovery techniques or skill practice including:</p> <ul style="list-style-type: none"> • Complex software simulations. • Extensive decision-based, branched scenarios. • Learner-controlled environments. • Interactive video. 	<p>Complex interactive graphics can be used when:</p> <ul style="list-style-type: none"> • Non-linear exploration of an object or environment is appropriate. • Consequential visual feedback for responses is appropriate. 	<ul style="list-style-type: none"> • Moderate to high level of interactivity. • Learner explores, discovers, and responds.
<p>Real-time simulations are complex, interactive graphics that mirror job environments. Examples include flight simulators and gaming programs.</p>	<p>Real-time simulations can be used when:</p> <ul style="list-style-type: none"> • Real-time participation is essential to achieving the learning objective. • Maximum flexibility in the learner environment is required. • Customized visual feedback for responses is required. • Content mastery is critical. • Certification or qualification is required. 	<ul style="list-style-type: none"> • High level of interactivity. • Learner responds to stimuli.

Appendix I

Lesson Content Flow Diagram

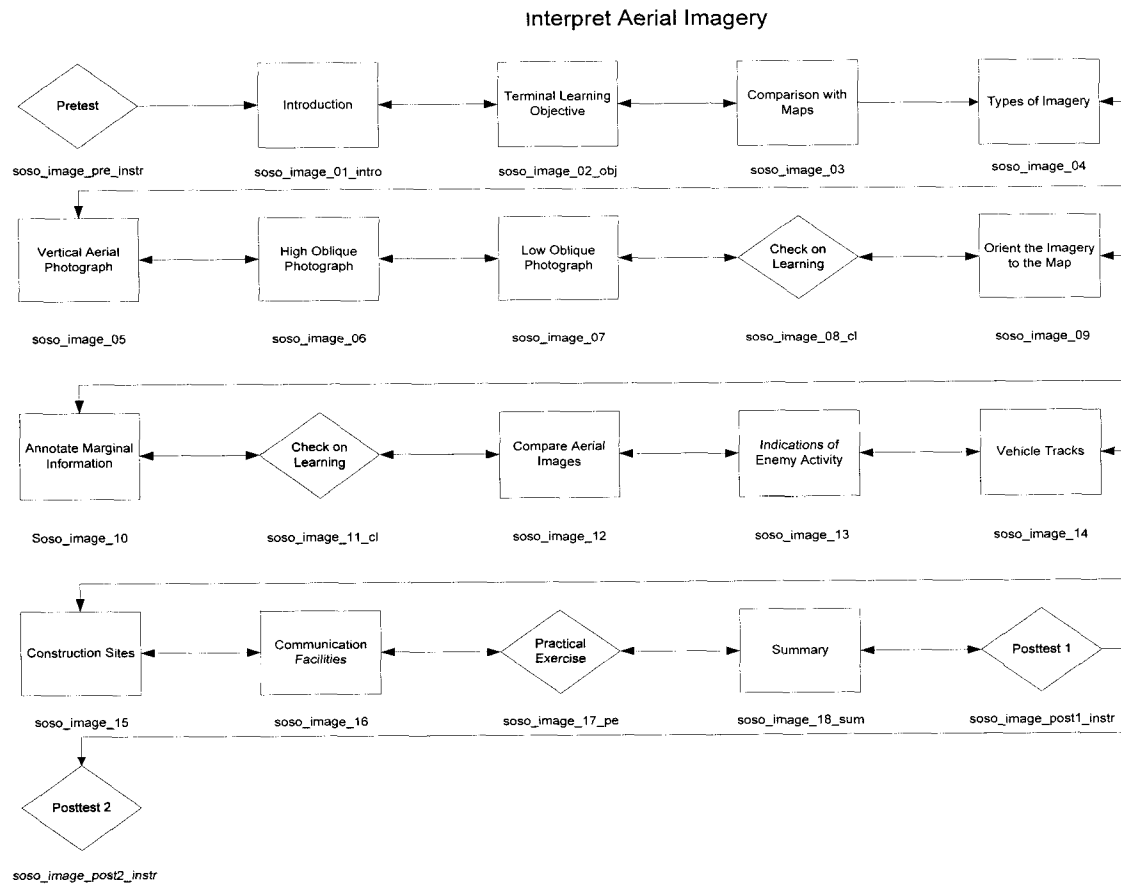


Figure I-1. Sample Lesson Content Flow Diagram.

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Appendix J
Acronyms

ADTL
Armywide Doctrinal and Training Literature

API
Application Program Interface

ASAT
Automated Systems Approach to Training

ATSC
Army Training Support Center

DID
Data Item Description

dL
Distance Learning

DLETP
Distributed Learning Education and Training Products

DTDCD
Directorate of Training, Doctrine, and Combat Development

ELO
Enabling Learning Objective

GFI
Government Furnished Information

GUI
graphical user interface

HTML
hypertext markup language

IMDP
Instructional Media Design Package

IMI
Interactive Multimedia Instruction

Fort Knox Pam 350-70 (25 Aug 06)

LMS
Learning Management System

LS
Learning System

PWS
performance work statement

SACG
Special Assistant to the Commanding General

SCO
sharable content object

SCORM
Sharable Content Object Reference Model

SME
subject matter expert

TATS
The Army Training System

TDD
Training Development Division

TDDT
Training Doctrine & Development Tool